DRAFT

# 75015

Ilmenite Basalt

1006 grams

*Figure 1: Photo of 75015 showing sap pits on exterior surface. NASA S73-16676. Cube is 1 cm. for scale.*

## Introduction

Camelot Crater at the Apollo 17 site (650 meter diameter) had an abundance of rocks in the rim extending down into the crater (Wolfe et al. 1981). Sample 75015 was chipped from one of the smaller boulders, 75035 and 75055 from others. These samples are similar and also, remarkably, similar to the ophitic Apollo 11 samples from many kilometers away.

*Figure 2: Thin section photomicrograph of 75015. Field of view is 3 cm. NASA S76-29483.*

75015 is a vuggy ilmenite basalt with only a few micrometeorite craters (figure 1). It has not been carefully studied and no age is available.

## Petrography

Brown et al. (1975) give the modal mineralogy for 75015 and found trace olivine (see table). Neal and Taylor (1993) described it as a coarse-grained (1-2 mm) ophitic basalt with pink pyroxene, plagioclase and ilmenite crystals up to 2 mm in length (figure 2). Silica is the most abundant accessory mineral.

## Mineralogy

No detailed mineral data are reported.

## Chemistry

The chemical composition of 75015 has been determined by Rhodes et al. (1976) and Warner et al (1975). It is generally similar to Apollo 11 sample 10020 (figures 3 and 4). Gibson et al. (1976) reported 2205 ppm sulfur.

## Radiogenic age dating

Sample 75015 has not been dated, presumably because it is similar to 75035 and 75055,

## Cosmogenic isotopes and exposure ages

Arvidson et al. (1976) reported a cosmic ray exposure age of 92 ± 4 m.y. (determined by Niemeyer using $^{81}Kr$ technique).

## Processing

75015 has been used for public display (figure 5).

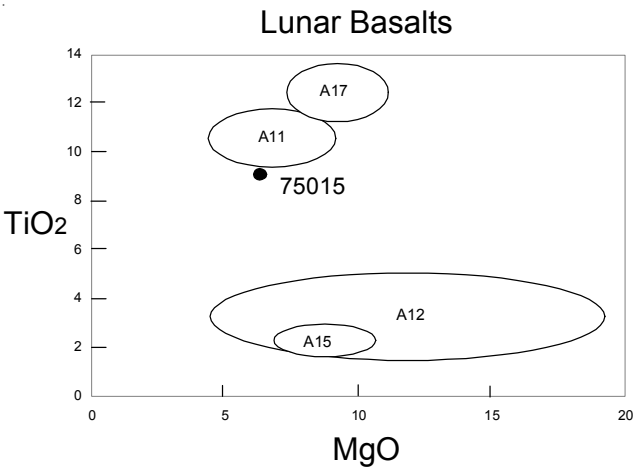


*Figure 3: Composition of 75015 compared with that of other lunar basalts.*

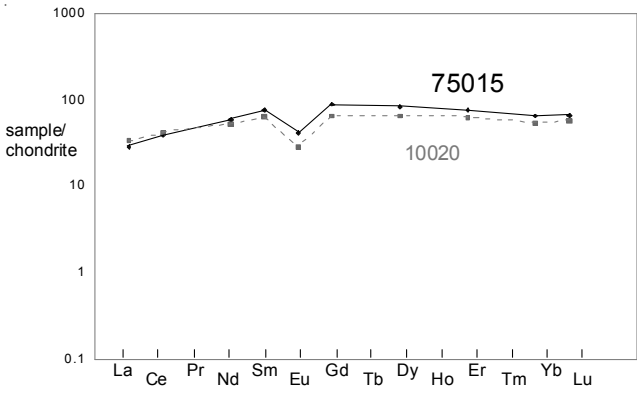


*Figure 4: Normalized rare-earth-element diagram for 75015 compared with that of Apollo 11 sample (data from Rhodes et al. 1976).*

*Figure 5: Sample 75015,53 on display. NASA S-91-36670.*

## Table 1. Chemical composition of 75015.

| *reference* | Wiesmann 75 | | Rhodes 76 | | Warner 75 | |
|---|---|---|---|---|---|---|
| *weight* | Nyquist 76 | | | | | |
| SiO2 % | | | 41.92 | (b) | | |
| TiO2 | | | 9.56 | (b) | 8.7 | (c ) |
| Al2O3 | | | 10.06 | (b) | 9.9 | (c ) |
| FeO | | | 18.77 | (b) | 21.2 | (c ) |
| MnO | | | 0.29 | (b) | 0.26 | (c ) |
| MgO | | | 6.2 | (b) | 5.4 | (c ) |
| CaO | | | 12.15 | (b) | 11.6 | (c ) |
| Na2O | | | 0.48 | (b) | 0.47 | (c ) |
| K2O | 0.074 | (a) | 0.06 | (b) | 0.05 | (c ) |
| P2O5 | | | 0.05 | (b) | | |
| S % | | | 0.2 | (b) | | |
| *sum* | | | | | | |
| | | | | | | |
| Sc ppm | | | 77 | (b) | 79 | (c ) |
| V | | | | | 24 | (c ) |
| Cr | | | 1490 | (b) | 822 | (c ) |
| Co | | | 14.7 | (b) | 15.2 | (c ) |
| Ni | | | | | | |
| Cu | | | | | | |
| Zn | | | | | | |
| Ga | | | | | | |
| Ge ppb | | | | | | |
| As | | | | | | |
| Se | | | | | | |
| Rb | 0.646 | (a) | 0.65 | | | |
| Sr | 215 | (a) | 215 | | | |
| Y | | | | | | |
| Zr | | | | | | |
| Nb | | | | | | |
| Mo | | | | | | |
| Ru | | | | | | |
| Rh | | | | | | |
| Pd ppb | | | | | | . |
| Ag ppb | | | | | | |
| Cd ppb | | | | | | |
| In ppb | | | | | | |
| Sn ppb | | | | | | |
| Sb ppb | | | | | | |
| Te ppb | | | | | | |
| Cs ppm | | | | | | |
| Ba | 87.5 | (a) | 87.5 | | | |
| La | 6.74 | (a) | 6.74 | | 12.2 | (c ) |
| Ce | 23.8 | (a) | 23.8 | | | |
| Pr | | | | | | |
| Nd | 26.5 | (a) | 26.5 | | | |
| Sm | 11.2 | (a) | 11.2 | | 16.7 | (c ) |
| Eu | 2.34 | (a) | 2.34 | | 3.15 | (c ) |
| Gd | 17.7 | (a) | 17.7 | | | |
| Tb | | | | | | |
| Dy | 20.1 | (a) | 20.1 | | 29 | (c ) |
| Ho | | | | | | |
| Er | 12.2 | (a) | 12.2 | | | |
| Tm | | | | | | |
| Yb | 10.8 | (a) | 10.8 | | 15.6 | (c ) |
| Lu | | | 1.62 | | 2.2 | (c ) |
| Hf | | | 9.6 | | | |
| Ta | | | | | | |
| W ppb | | | | | | |
| Re ppb | | | | | | |
| Os ppb | | | | | | |
| Ir ppb | | | | | | |
| Pt ppb | | | | | | |
| Au ppb | | | | | | |
| Th ppm | | | | | | |
| U ppm | | | | | | |

*technique: (a ) IDMS, (b) XRF, (c ) INAA*